QZX

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EDITOR'S NOTES

K5XY

The QZX history in the last issue ran a little longer than I had planned so there was only that article and the calendar. I am sorry that the calendar was late so that the first month of the year has almost already gone. All I can promise is the rest of the months will go quickly too.

In this issue is the article analyzing the QZX mailing list that was promised in the last issue.

I noticed that there is a very sophisticated program for the QL which will convert QL files to MSDOS and even CP/M formats. This program should be of particular interest to those who have the four QL programs in the MSDOS version too. It costs $50 and is available from Mechanical Affinity.

Some reports of the computer show last April in Dayton which has a large Sinclair contingent have appeared. There were at least four informal gatherings of Sinclairists and four formal tables in the hall. Over 50 people interested in Sinclair computers left their names on one mailing list or another. I presume that there will be another computerfest at about the same time this year.

Update Magazine is a good source of information on the Sinclair Computers. A particularly interesting ad appeared in the last issue. It offered ZX81 KITS for sale. Contact Paul Holmgren, 5231 Wilton Wood Court, Indianapolis, IN 46254.

The QZX Index is finally underway. The database itself is completely designed and mostly tested. Almost all of the articles are already entered. The entering of the articles is turning into quite a big job, but it is proceeding rapidly. And I guess I can blame the index for the delay in this issue, but that would not be entirely correct.

An announcement about the availability of the index will be made in QZX in the next issue.

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

FREE..RAM chips, 2114 for the RAM add-on in the July issue of QZX. Please send postage and mention the number of chips you want. Bo Barry, W4GHV, 8118 Kensington Lane, Harrisburg, NC 28075.

FOR SALE: Back issues of QZX, $1.00 each postpaid. QZX, 2025 O'Donnell, Las Cruces, NM 88001.

The following article is reprinted from Update Magazine (Oct 1992)

How to Convert a Surplus WC2050 Modem into an RS-232 SERIAL INTERFACE for your TS1000/1500/2068

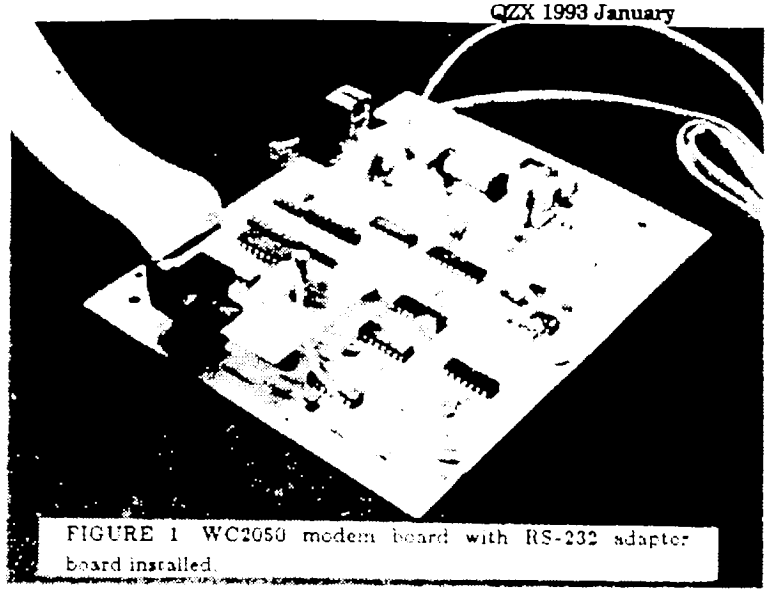

FIGURE 1 WC2050 modem board with RS-232 adaptor board installed.

INTRODUCTION

The purpose of this article is to show you how, with the addition of a few inexpensive components, you can convert a WC2050 modem board into a general purpose RS232 serial interface.

In October of last year, Anchor Automation auctioned off several thousand completely assembled WC2050 Modem boards as electronic surplus. Fortunately for Timex users, these boards were discovered by Timex support companies like Zebra Systems, Clifford Associates, Sunset Electronics, and RMG, and are being resold to Timex users at bargain basement prices.

BLOCK DIAGRAM

Now take a look at Figure 2. It shows a block diagram of the modem board. The address decoding, crystal oscillator, frequency divider and 8251 serial I/O, and power supply portions provide nearly all we need for an RS232 interface. As a complete modem, the input and output serial data available at the points marked A and B, would be connected to the modem's analog circuitry and translated between tone frequencies and voltage levels. For an RS-232 interface we need to redirect these signals to DC voltage level translators.

RS-232 PARTS

Next take a look at Figure 3. It shows a schematic of the recommended RS-232 adaptor circuit. The parts list is contained in Figure 4. Notice that there are only three IC's. A MC1889 Line Receiver is used to buffer the incoming signals; a MC1888 Line Driver is used to buffer the outgoing signals; and an Intersil ICL7662 switching regulator is used to develop the required negative supply voltage from the modem's +9 Volt supply. An alternative to using the switching regulator would be to just use a second 9 VDC A/C adaptor. In our prototype we used a 9-Pin Male Atari Joystick style connector for our RS232 output, but you can directly wire in a cable or another choice of connector.

INSTALLATION PROCEDURE

Before installing the RS-232 adaptor board, be sure you have a working modem board in front of you. It is not important that the modem's analog section be working as long as the digital portion of the board is working. Of course if the entire modem does work, the digital portion will work.

Build up the circuit shown in figure 3. The parts are easy to find except for the Intersil regulator (see below). An optional etched and drilled PC board is available to simplify building the circuit, but any small protocard such as the ones available from radio shack will do fine.

CONSTRUCTION HINTS

The RS-232 adaptor board requires 9 signals from the modem board:

OUTPUT SIGNALS: RTS , TX, DTR
INPUT SIGNALS: RX, CTS, DSR
POWER SIGNALS: GROUND, +5 Volts, +9 Volts

Eight of these signals are available at the pins of the 8251 serial I/O chip. The only signal not present on the chip is the +9 volt power, which can be picked up on one side of the modem's DATA Light Emitting Diode (LED). Our prototype board (shown in Figure 1), takes advantage of this and uses a pin-and-socket arrangement to make the 8 connections at the IC. First a 28-pin IC socket is soldered right on top of the 8251. Then pins are soldered onto the RS-232 PC Board so that the board can plug in, right on top of the IC. The ninth signal required is made by attaching a single wire between the RS-232 board and the +9 Volt power were the LED-is. The positive side of this LED is the lead closest to the corner of the modem board.

TRACE CUTS

You must make three trace cuts on the modem PC board. This is to disconnect the three modem input-signals that go from the modem's analog section to the 8251 chip. These signals are replaced with those coming from your RS-232 adaptor board. The traces to cut are shown in Figure 5.

SOFTWARE & TESTING

If you just want to test out your RS-232 by itself you can do a simple wrap around test by temporarily connecting CTS to RTS, and TX to RX. A sample TS2068 software driver for the modem is shown in figure 6. Under this test arangement, whatever you send out will be wrapped around and received back.

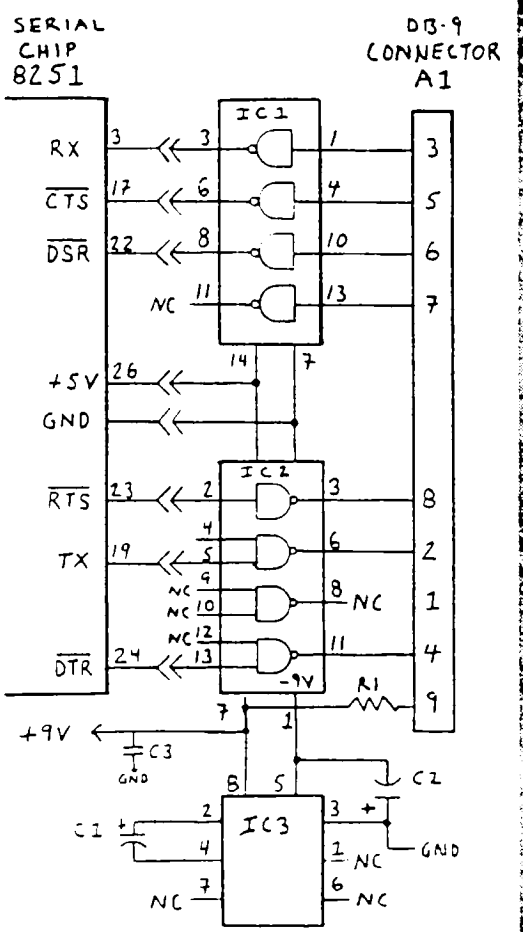

FIGURE 3. RS-232 ADAPTOR SCHEMATIC

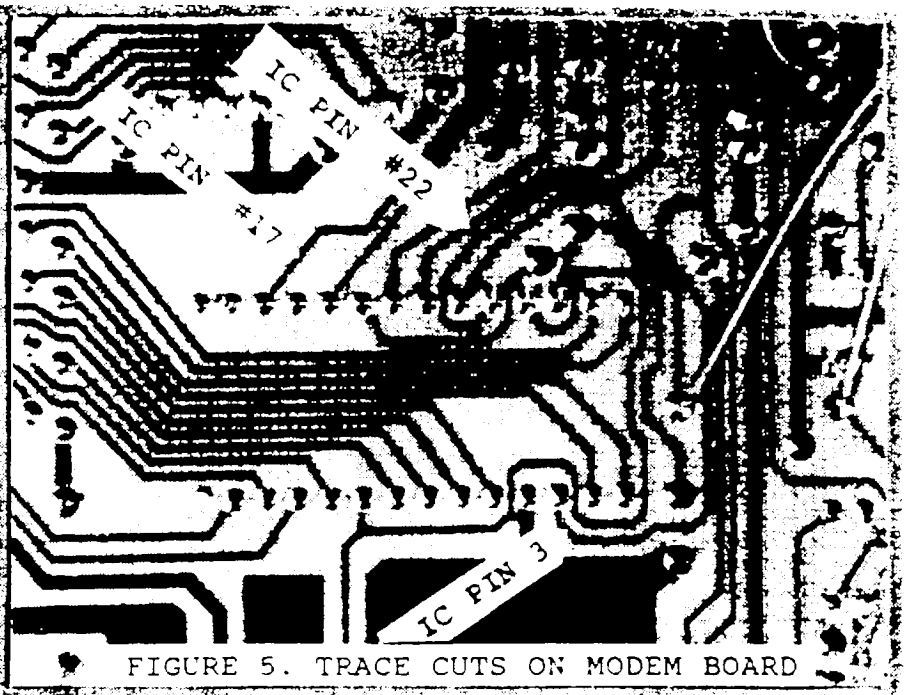

FIGURE 5. TRACE CUTS ON MODEM BOARD

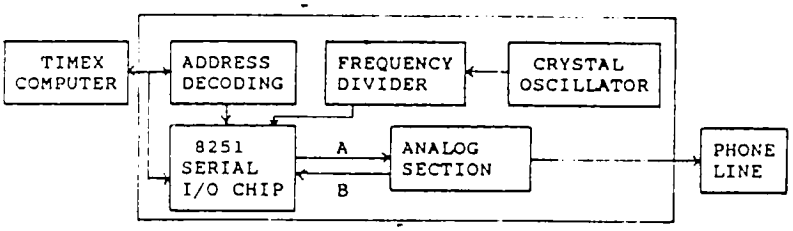

FIGURE 2. MODEM BLOCK DIAGRAM

FIGURE 4. WC2050-TO-RS232 PARTS LIST

IC1	MC1489 QUAD LINE RECEIVER
IC2	MC1488 QUAD LINE DRIVER
J1,J2	WIRE JUMPERS, 0.3 INCH
J3	WIRE JUMPER, 4.5 INCH
A1	CONNECTOR, DB-9 MALE "JOYSTICK TYPE"
A2	DUAL ROW WIRE-WRAP HEADER PINS
R1	RESISTOR, 1K 1/4W
PC89-C	PRINTED CIRCUIT BOARD
C3	0.1UF 25V CER. DISC. (SUPPLY BYPASS)
----------	POWER SECTION - VERSION ONE----------
IC3	INTERSIL ICL7662 POWER CONVERTER IC
C1	10UF 16V ALUM. ELECTROLYTIC (CHARGE PUMP)
C2	10UF 16V ALUM. ELECTROLYTIC (OUTPUT)
----------	POWER SECTION - VERSION TWO ----------
A3	2.5MM OR 3.5MM JACK (NEGATIVE POWER)
X1	AC POWER ADAPTOR
----------	----------

FIGURE 6. Sample TS2068 BASIC driver for wrap-around test at 1200 BAUD. Change 78 in line 14 to 79 for 300 baud.

```
  10 OUT 119,0: REM send Zero to
                   clear UART chip
  11 OUT 119,0
  12 OUT 119,0
  13 OUT 119,64: REM UART reset
  14 OUT 119,78: REM 1200b,8 bit
                   NO parity
  15 OUT 119,55: REM Enable Xmit
                   and Receive
  20 REM Each byte sent OUT 115
     will arrive on the Transmit
     line of the RS-232 port.
  25 REM Example:
  30 PRINT "This is a test."
  40 LPRINT "This is a test."
  50 LET a$="This is a test.": G
O SUB 1000
  60 PRINT "End of TEST."
  70 LPRINT "End of TEST."
  80 LET a$="End of TEST."  GO S
UB 1000
  90 STOP
1000 LET i=LEN a$  IF i=0 THEN G
O TO 1050
1010 FOR x=1 TO i
1020 OUT 115,CODE a$(x): PAUSE 4
1030 PRINT CHR$ IN 115;
1040 NEXT x
1050 RETURN
```

QZX READERS

K5XY

Because the subscription list for QZX is in a computer data base it is relatively easy to do a little analysis of the list. The current data base does not include everyone who has ever subscribed because a number of years ago the data base program was changed and only the current subscribers were transferred. The following statistics are taken from a sampling of about half the total subscriber list.

The table below lists the states and the percentage of the US hams on the subscription list which come from that state. In addition there are about 11 % of the subscription list which have addresses outside the United States.

Reader Distribution by State

State	%	State	%
AL	1	ND	1
AR	1	NE	1
AZ	1	NH	1
CA	16	NJ	1
CO	2	NM	2
CT	1	NV	1
FL	8	NY	7
GA	1	OH	3
HI	1	OK	1
IA	1	OR	1
ID	1	PA	6
IL	6	RI	1
KY	1	SC	2
LA	1	TN	3
MA	3	TX	5
MD	3	VA	3
MI	3	VT	1
MN	1	WA	3
MO	1	WI	2
NC	1	WV	1

(Rounding keeps the percentages from adding to 100.)

Note that the subscription list is pretty well spread throughout the country. California is the only state with a particularly large number of readers.

A closer look at the current subscription list shows that three hams ,WA1JFD, WA5DLI, and WA6OUC have been with QZX from the start. An additional 12 people have subscribed during parts of 10 or more years. They are K8NZZ, N9GIH, W1DRD, W6HIA, KB3KD, WA4BQE, WB2USJ, WB8KON, and Ike Walker. The last person named indicates that not all of our readers have a ham license. In fact 28 % of the active readers do not have a call.

Almost all of our readers are long term subscribers. Almost 50 % have subscribed to QZX for at least parts of 10 or more years. If you make that 9 or more years, the percentage increases to 72 %.

ROM Differences in the TS1500

K5XY

Some people are a bit unsure about the way in which the TS1500 differs from its predecessors , besides the improved keyboard. I repeat here some information gleaned from previous issues of QZX, particularly the December 1983 issue, about the very minor differences in the ROM.

There were only 61 bytes changed at the hex addresses 0002-0004; 0006; 0362; 03C6-0401; 16BC; and 18DO. In addition some addresses which had not previously been used were given code.

In the latter case the locations 407B and 407C (hex) now contain the address of the front of BASIC.

The changes introduced are

- Different power-up initialization
- Fix of the LPRINT bug
- Fix of an obscure bug in the least significant bit in division.

Two procedural changes are introduced in initialization. The first eliminates the routine check for RAM because the TS1500 came with 16K RAM so there is no need for a check. All 16 K is cleared to zeros. The second performs a check to provide for cartridge power-up by checking the contents of memory location 2000h (8192 decimal). If it contains a 1, then a jump is made to 8192.

```
03DA    LD HL, 2000h
        DEC (HL)
        JR NZ, 03EHh
        JP (HL)
03E2    ...
```

This latter process could be disastrous if you have RAM at 8192 and it contains a 1. On the other hand this is a handy way to bypass the system ROM at power-up.

There is also a small difference in the use of the OUT instruction in the slow mode to addresses with bit 7 set in the port address. The solution is to change the OUT instructions to address port 4 rather than the original address to port 252. The main place where this difficulty shows up for hams is in the CWSS program for CW send/receive on the ZX81. For the details see QZX July 1984.

While this ROM cleared up one bug, unfortunately it introduced another. This bug occurs when a LOAD command aborts. In the TS1000 ROM, if a LOAD aborts, a jump is made to the initialization routine at 03E5h, which is part of NEW. This routine resets the machine stack which is just below RAMTOP.

The TS1500 ROM jumps to an address which is actually in the middle of an instruction. The problem is that address 0362h has been changed to E3h instead of E2h.

This bug causes unpredictable results upon LOAD failure. Even if the system does not crash, the stack may be reset above or below RAMTOP.

This bug is really not much of a problem if you do not have anything above RAMTOP. Then it is just an inconvenience, making you pull the plug.

Corrections

K5XY

There are two corrections to the article entitled Correction in the December 1988 issue of QZX. The first month mentioned should read April. The second month should read October.

You may well question the utility of these long overdue corrections, but the errors were discovered only recently as I was building an index for QZX, and I decided to put the information here to keep the record straight in the improbable case somebody needs the information.

QZX FRIENDS

WA6DLI - Bob says that he has not been doing much with his QL recently. He gave his TS2068 outfit to WA6OUC, Warren, another reader.

WA4BQE - Ed became the second reader to extend his subscription to 1994 when he renewed and contributed to the postage fund.

W6HAI - John also renewed and contributed to the postage fund.

W4AT - Charles renewed and contributed to the postage fund. He also said that he found the history of QZX in the December issue especially interesting.

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